# PATENT ABSTRACTS OF JAPAN

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## (54) LIQUID CRYSTAL DISPLAY ELEMENT

(57)Abstract:
PURPOSE: To obtain a light scattering type liquid crystal display element which is a large area and thin film type, is excellent in whiteness and brightness of a surface viewed from an observer side, makes the color of a light absorption plate behind the element hardly visible, has the excellent visibility to make the color of the light absorption plate behind the element distinctly visible at the time of transparency and is suitable for a reflection type display system.
CONSTITUTION: This light scattering type liquid crystal display element is constituted by having a light controllable layer between two sheets of substrates having electrode layers, incorporating a liquid crystal material and transparent solid material into this light controllable layer and disposing a light absorption layer or light absorption plate on the side opposite to the light control layer of the one substrate. The light absorption layer or light absorption plate of the element described above has chromaticity of 0.3 in the value of X in the chromaticity diagram of 1931 xyz color specification systems stipulated by International Illumination Committee or chromaticity of $(X \times 5) \div 7$ in the value of Y. Further, this light scattering type liquid crystal display element is provided with a flection increasing film between the substrate and the light absorption plate or the light absorption plate.

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CLAIMS

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[Claim(s)]
[Claim 1] For the value of X [ in / on the light-scattering mold liquid crystal display component which it has a modulated light layer between two substrates which have an electrode layer, and this modulated light layer contains a liquid crystal ingredient and transparency solid matter, and the modulated light layer side of one substrate forms a light absorption layer or a light absorption plate in the opposite side, and changes, and / in an absorption layer or a light absorption plate / the chromaticity diagram of a Commission Internationale de l'Eclariage 1931xyz color coordinate system ], 0.3 or less chromaticity or the value of Y is [Equation 1]. (Xx5) The light-scattering mold liquid crystal display component characterized by having a chromaticity not more than /7.
[Claim 2] The light-scattering mold liquid crystal display component according to claim 1 characterized by being the vacuum evaporationo film or paint film to which a light absorption layer changes from a light absorption object [claim 3] The light-scattering mold liquid crystal display component according to claim 1 or 2 characterized by preparing the reflective increment film between a substrate, a light absorption plate, or a light absorption layer.
[Claim 4] The light-scattering mold liquid crystal display component according to claim 1, 2, or 3 characterized by transparency solid matter being the hardened material of the polymerization nature constituent containing a polymerization nature compound.
[Claim 5] The light-scattering mold liquid crystal display component according to claim 1, 2, 3, or 4 to which a modulated light layer is characterized by having three-dimensions mesh-like transparency solid matter in the continuation layer of a liquid crystal ingredient.

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[Translation done.]

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] the light-scattering mold liquid crystal display component which can make this invention to a large area — being related — further — detailed — cutoff of light, and transparency — electric — operating it — an alphabetic character and a graphic form — displaying — high-speed responsibility — with — **** — it is related with the light-scattering mold liquid crystal display component used as high information display objects, such as a display of display objects, such as a billboard, a guide plate, and an ornament display board, OA equipment, etc., by switching a display electrically.
[0002]
[Description of the Prior Art] The approach of controlling transparency and dispersion is learned by distributing liquid crystal in a polymer and adjusting the refractive index of liquid crystal and a polymer conventionally.
[0003] In such a light-scattering mold liquid crystal display component, in order to perform monochrome colorization, a light absorption object is arranged behind a light-scattering mold liquid crystal display component, and the method of presentation with which the color of a light absorption object in back is observed is known at the time of nebula and transparency at the time of dispersion.
[0004] However, by this approach, the color of a light absorption object in back was visible to the front face by the side of the observer of a light-scattering display device at the time of dispersion, and it had the fault that visibility with the color of the color absorption plate in back which appears at the time of transparence was bad.
[0005] As an approach of solving this fault, to JP,1-74531,A and JP,3-175421,A, a light-scattering mold liquid crystal display component and a light absorption object in back are detached and arranged, and the approach which make it hard to appear the color of a light absorption object in back at the time of dispersion is proposed.
[0006] Moreover, guest host (GH) coloring matter is contained in the liquid crystal of a light-scattering mold liquid crystal display component, a fluorescence color plate is arranged back [ the ], and the approach which make it hard to be visible [ in the color of a light absorption object in back ] at the time of dispersion is proposed by JP,2-3011,A.
[0007]
[Problem(s) to be Solved by the Invention] Thus, the color of a light absorption object in back has stopped easily the manufactured light-scattering mold liquid crystal display component being able to be visible at the time of dispersion. However, by the approach of detaching and arranging a light-scattering mold liquid crystal display component and a light absorption object in back, the thickness of a display device will become thick.
[0008] On the other hand, it had the fault of the approach of making guest host (GH) coloring matter containing in the liquid crystal of a light-scattering mold liquid crystal display component not having brightness in a display object, and becoming a dark liquid crystal display component at the time of dispersion.
[0009] The technical problem which this invention tends to solve has the thin thickness of a light-scattering mold liquid crystal display component, the front face by the side of an observer is white at the time of dispersion, it is bright to it, the color of a light absorption object in back cannot be seen easily at it, and the color of a color absorption plate in back is at the time of transparence to offer the bright light-scattering mold liquid crystal display component excellent in the visibility which can be recognized clearly.
[0010]
[Means for Solving the Problem] As a result of repeating research wholeheartedly, this invention persons had the thin thickness of a light-scattering mold liquid crystal display component, color of a light absorption object in back could not be seen at the time of dispersion easily brightly [ the front face by the side of an observer is white, and ], and the bright light-scattering mold liquid crystal display component excellent in the visibility that the color of a color absorption plate in back can recognize clearly was found out at the time of transparence.
[0011] That is, the modulated light layer side of one substrate sets a light absorption layer or a light absorption plate in the opposite side for the light-scattering mold liquid crystal display component which prepares and changes by having a modulated light layer between two substrates which have an electrode layer in order to solve the above-mentioned technical problem, and this modulated light layer containing a liquid crystal ingredient and transparency solid matter, and this invention is [0012]. For the value of X [ in / in an absorption layer or a light absorption plate / the chromaticity diagram of a Commission Internationale de l'Eclariage 1931xyz color coordinate system ], 0.3 or less chromaticity or the value of Y is [0013].
[Equation 2] (Xx5) /7[0014] The light-scattering mold liquid crystal display component characterized by having the following chromaticities is offered.
[0015] An example of the structure of the light-scattering mold liquid crystal display component of this invention was shown in drawing 1 and drawing 2 . One is a transparency substrate among drawing 1 , 2 is a transparent electrode, 3 is a modulated light layer which consists of a liquid crystal ingredient and transparency solid matter, 4 is a sealing agent, 5 is a light absorption layer or a light absorption plate, one is a transparency substrate among drawing 2 , 2 is a transparent electrode, 3 is a modulated light layer which consists of a liquid crystal ingredient and transparency solid matter, 4 is a sealing agent, 5 is a light absorption layer or a light absorption plate, and 6 is the reflective increment film.
[0016] For the value of X in the chromaticity diagram of a Commission Internationale de l'Eclariage 1931xyz color coordinate system,

0.3 or less chromaticity or the value of Y is [ the light absorption plate in here ] [0017].
[Equation 3] (Xx5) /7[0018] Especially the manufacture approach of of the quality of the material of the light absorption section itself, and a light absorption layer or a light absorption plate is not limited that what is necessary is just the object which has the following chromaticities.
[0019] Paper, a film, or glass colored by dyeing, printing, vacuum evaporationo, etc. can be used for the light absorption layer or light absorption object used by this invention that what is necessary is just a field-like light absorption object. As a commercial light absorption plate, "The first edition of the DIC color guide PARTII 2486 by Dainippon Ink & Chemicals, Inc." "The first edition of the "first edition of DIC color guide PARTII 2562" DIC color guide PARTII 2608" "The first edition of the "first edition of DIC color guide PARTII 2619" DIC color guide PARTII 2625" "The first edition of the "first edition of DIC color guide PARTII 2593" DIC color guide PARTII 2596" "The first edition of the "first edition of DIC color guide PARTII 2588" DIC color guide PARTII 2611" "The first edition of the DIC color guide PARTII 2486", the "first edition of the DIC color guide PARTII 2405", the "first edition of the "first edition of DIC color guide PARTII 2637" DIC color guide PARTII 2406 etc.", etc. are mentioned.
[0020] Using this light absorption layer or a light absorption plate, as shown in drawing 1 and drawing 2 , when not arranging a light absorption plate by arranging to the opposite side, compared with the case where light absorption plates other than the above have been arranged, the color of a light absorption object [ white the front face by the side of the observer of a light-scattering mold liquid crystal display component and bright in it ] in back stops easily being able to be visible with the modulated light layer of one substrate at the time of light scattering. Moreover, the color of a light absorption plate in back can recognize clearly at the time of transparence. Therefore, it becomes the light-scattering mold liquid crystal display component excellent in contrast or visibility.
[0021] Although the location of a light absorption plate may be stuck to a substrate, it excels in visibility that media, such as an air space, are preferably arranged between a substrate and a light absorption plate. Moreover, if side light lighting etc. is used between a light-scattering mold liquid crystal display component and a light absorption plate, much more desirable visibility can be acquired.
[0022] The reflective increment film used by this invention carries out the laminating of two or more kinds of media which have a difference in the refractive index of a light transmission nature medium, and adjusts a desired reflection factor by the count of a laminating of a medium. Moreover, with the combination of the medium which carries out a laminating, the refractive index of the medium used to the direction of incidence of light can make it able to change from size to smallness, fossete size, size size, and small size size, and can choose the combination of the light transmission nature medium of a different refractive index according to the purpose of use. Moreover, since high contrast will be acquired by the small count of a laminating if it enlarges as much as possible, the difference of the refractive index between the media combined and used is desirable.
[0023] As an ingredient of the reflective increment film, if a light transmission layer can be formed, it will be good and a macromolecule, a gas, a dielectric film, a metal thin film, optical glass, etc. will be mentioned. Moreover, you may be the shape not only of what makes a film configuration in itself but rubber, and a soft object, and even if liquefied, you may use it by carrying out the seal of the periphery. Moreover, it is more desirable if it uses in the configuration which added other functions, such as an adhesion function and an ultraviolet-rays cut function.
[0024] Since what is necessary is just to accumulate the light transmission nature medium by which refractive indexes differ one by one as the laminating approach of the reflective increment film, the approach which should just form and sticks the film of a different light transmission nature medium by the general thin film formation approaches, such as sputtering and vacuum evaporationo, using adhesives etc., and the approach of fixing a part of the medium with adhesives etc. are mentioned. It is desirable to use what shows light transmission nature, and since the adhesives to be used can be used as a medium which constitutes the reflective increment film if a different thing from the refractive index of the light transmission nature medium to be used is used, they are more more desirable still.
[0025] The substrates used by this invention may be a strong ingredient, for example, glass, a metal, etc., and may be the ingredient which has flexibility, for example, the thing like plastic film. And two sheets counter and a substrate may separate suitable spacing. Moreover, two substrates have transparency and must carry out vision of the modulated light layer pinched between the two sheets from the external world. However, perfect transparency is not made indispensable.
[0026] According to the purpose, a transparent electrode may be arranged on that whole surface or a partial target at this substrate.
[0027] However, in the case of the ingredient which has the flexibility like plastic film, after fixing to a strong ingredient, for example, glass, a metal, etc., it can use for the manufacture approach of this invention.
[0028] In order to control the thickness of the transparency solid matter which makes homogeneity adhere to a substrate, it is desirable to make the spacer for spacing usually intervene like a well-known liquid crystal device between two substrates.
[0029] A spacer may be mixed in the solution of a liquid crystal ingredient, a monomer, the solution of oligomer or an organic solvent, a monomer, or oligomer, and SUPESA may be applied to it on one substrate.
[0030] As a spacer, the thing for various liquid crystal cells, such as a Mylar, an alumina, rod type glass fiber, a glass bead, and a polymer bead, can be used, for example.
[0031] A modulated light layer is formed from a liquid crystal ingredient and transparency solid matter. And although transparency solid matter consists of the mineral matter like a glass bead, it is desirable that it is the hardened material of the polymerization nature constituent containing a polymerization nature compound. Moreover, as for transparency solid matter, it is desirable to exist in the shape of a three-dimensions mesh in the continuation layer of a liquid crystal ingredient.
[0032] Of course, it does not require that the liquid crystal ingredient used by this invention is a single liquid crystallinity compound, what has the forward dielectric constant anisotropy of them is [ that to be the mixture also containing matter other than two or more sorts of liquid crystal compounds and liquid crystal compounds and what is necessary is just what is usually recognized as a liquid crystal ingredient by this technical field ] desirable, and the liquid crystal device after manufacture should just be the liquid crystal which can acquire a good property.
[0033] As liquid crystal used, a nematic liquid crystal, a smectic liquid crystal, and cholesteric liquid crystal are desirable, and especially a nematic liquid crystal is desirable. In order to improve the engine performance, chiral compounds, dichroic colors, etc., such as cholesteric-liquid-crystal, chiral nematic liquid crystal, and chiral smectic liquid crystal, may be contained suitably.
[0034] The liquid crystal ingredient used by this invention has the desirable combination constituent which consists of one or more sorts of compounds chosen from the compound group shown below, for the purpose of improving solubility with the property of a liquid crystal ingredient, i.e., the phase transition temperature of an isotropic liquid and liquid crystal, the melting point, viscosity, delta n and

delta epsilon, a polymerization nature constituent, etc., can be chosen and blended suitably and can be used.
[0035] As a liquid crystal ingredient, for example 4-permutation benzoic-acid 4'-permutation phenyl ester, 4-permutation cyclohexane-carboxylic-acid 4 '- permutation phenyl ester and 4-permutation cyclohexane-carboxylic-acid 4'-permutation biphenyl ester, 4-(4-permutation cyclohexane carbonyloxy) benzoic-acid 4'-permutation phenyl ester, 4-(4-permutation cyclohexyl) benzoic-acid 4'-permutation phenyl ester, 4-(4-permutation cyclohexyl) benzoic-acid 4'-permutation cyclohexyl ester, A 4-permutation 4'-permutation biphenyl, and 4-permutation phenyl-4 '- permutation cyclohexane, 4-permutation 4"-permutation terphenyl and 4-permutation biphenyl 4'-permutation cyclohexane, a 2-(4-permutation phenyl)-5-permutation pyrimidine, etc. can be mentioned.
[0036] The rate of the liquid crystal ingredient in a modulated light layer has 60 desirable % of the weight or more, and 70 - 90% of the weight of especially its range is desirable. ("% of the weight" is meant"%" hereafter)
[0037] The polymerization nature constituent containing a polymerization nature compound consists of a polymer plasticity monomer and/or oligomer, a polymerization initiator, etc.
[0038] As a polymer plasticity monomer, for example as styrene, chloro styrene, alpha methyl styrene, and a divinylbenzene; substituent MECHIRE, ethyl, propyl, butyl, amyl, 2-ethylhexyl, Octyl, nonyl, dodecyl, hexadecyl, octadecyl, cyclohexyl, Benzyl, methoxy ethyl, butoxy ethyl, phenoxy ethyl, Al Lil, Metallyl, glycidyl, 2-hydroxyethyl, 2-hydroxypropyl, The acrylate which has a radical like 3-chloro-2-hydroxypropyl, dimethylaminoethyl, and a diethylaminoethyl, Methacrylate or fumarate; Ethylene glycol, a polyethylene glycol, Propylene glycol, a polypropylene glycol, 1, 3-butylene glycol, Tetramethylene glycol, hexamethylene glycol, neopentyl glycol, Pori (meta) acrylate or Pori (meta) acrylate, such as trimethylol propane, a glycerol, and pentaerythritol; Butanoic acid vinyl, Vinyl acetate or benzoic-acid vinyl, acrylonitrile, cetyl vinyl ether, A limonene, a cyclohexene, diallyl phthalate, 2-, 3-, or 4-vinylpyridine, An acrylic acid, a methacrylic acid, acrylamide, methacrylamide, N-hydroxymethyl acrylamide or N-hydroxyethyl methacrylamide, and those alkyl ether compounds; Ethyleneoxide or propylene oxide three mols or more is added to one mol of trimethylol propane. Obtained JI or Tori (meta) acrylate of triol; Ethyleneoxide or propylene oxide two mols or more is added to one mol of neopentyl glycol. JI of the obtained diol Acrylate; 2-hydroxyethyl (Meta) (Meta) one mol [ of acrylate ], phenyl isocyanate, or one mol [ of n-butyl isocyanates ] resultant; -- Pori (meta) acrylate [ of dipentaerythritol ]; — Pori of tris-(hydroxyethyl)-isocyanuric acid — Acrylate; Tris - (Meta) (Hydroxyethyl) Pori of - phosphoric acid Acrylate; G (Meta) (Hydroxyethyl) Monochrome of - dicyclopentadiene Acrylate (Meta) Or JI Acrylate; (Meta) pivalate ester neopentyl-glycol-diacrylate; — caprolactone denaturation hydroxy pivalate ester neopentyl-glycol-diacrylate; — straight chain aliphatic series diacrylate; — polyolefine denaturation neopentyl glycol diacrylate etc. It can mention.
[0039] As polymer plasticity oligomer, various acrylate oligomer, such as epoxy (meta) acrylate, polyester (meta) acrylate, polyurethane (meta) acrylate, and polyether (meta) acrylate, can be used, for example.
[0040] The transparency solid matter which has this three-dimensional network may have flexibility and elasticity, as long as it can respond not only to a strong object but to the purpose.
[0041] As a polymerization initiator, it is 2-hydroxy, for example. - 2-methyl-1-phenyl propane-1-ON ("DAROKYUA 1173" by Merck Co.), 1-hydroxy cyclohexyl phenyl ketone ("IRGACURE 184 " by Ciba-Geigy), 1-(4-isopropyl phenyl)-2-hydroxy-isobutane-1-ON ("DAROKYUA 1116" by Merck Co.), Benzyl dimethyl ketal ("IRGACURE 651 " by Ciba-Geigy), 2-methyl-1-[4-(methylthio) phenyl]-2-morpholinopropanone -1 ("IRGACURE 907 " by Ciba-Geigy), 2 Four Mixture of - diethylthio xanthone (the "kaya cure DETX" by Nippon Kayaku Co., Ltd.), and p-dimethylamino ethyl benzoate ("kaya cure EPA " by Nippon Kayaku Co., Ltd.), The mixture of an isopropyl thioxan ton ("can TAKYUA ITX" by the WORD PUREKIN soup company) and p-dimethylamino ethyl benzoate etc. is mentioned.
[0042] The operating rate of a polymerization initiator has 0.1 - 10.0% of desirable range of a polymerization nature constituent.
[0043] Radiations, heat, etc., such as ultraviolet rays and an electron ray, are mentioned that what is necessary is just that in which a polymer forms a suitable three-dimensions mesh as energy for polymerizations.
[0044] Especially the polymerization method by UV irradiation is suitable. Although optical exposure reinforcement and an exposure also need the above in fixed strength in the polymerization in the inside of the liquid crystal ingredient of the polymerization nature constituent by UV irradiation, it is influenced by the reactivity of a polymerization nature constituent and the class of polymerization initiator, and concentration, and can attain equalization for three-dimensions mesh-like formation and the magnitude of the mesh by selection of suitable optical reinforcement. Furthermore, it is effective to irradiate homogeneity in time as the optical exposure approach and superficially preferably, when hitting a momentarily strong light for the polymerization nature constituent which intervenes between substrates, advancing a polymerization and attaining equalization for the magnitude of a mesh for the reason. That is, the polymer of the shape of a uniform three-dimensions mesh is realizable in a liquid crystal continuation layer by irradiating in the shape of a pulse by suitable optical reinforcement.
[0045] Average spacing of the mesh of the three-dimensional network formed from transparency solid matter has the desirable range of 0.2-5 micrometers. Moreover, the thickness of a layer which has transparency solid matter has the desirable range of 1-30 micrometers, in order to acquire sufficient contrast between the opacity by light scattering, and the transparency attained electrically or thermally according to the purpose of use.
[0046]
[Example] Hereafter, the example of this invention is shown and this invention is explained still more concretely. However, this invention is not limited to these examples. In addition, in an example, "% of the weight" is expressed"%."
[0047] Moreover, the reinforcement of the ultraviolet rays in each example and the example of a comparison is the value which measured the chromaticity value using the color color difference meter "CR-200b" by Minolta Camera Co., Ltd. using the uni-meter "UIT-101" by USHIO, INC., and photo detector "UVD-365PD], respectively.
[0048] (Example 1) "PN001" (Roddick liquid crystal ingredient) 80.0%, Laurylacrylate 3.92%, "Kaya Rudd (KAYARAD) -HX-620" (Caprolactone denaturation hydroxy pivalate ester neopentyl glycol diacrylate by Nippon Kayaku Co., Ltd.) 15.68% and "DAROKYUA 1173" (the polymerization initiator by Merck Co.; 2-hydroxy - 2-methyl-1-phenyl propane-1-ON) from 0.4% Having put between the glass substrates which have the ITO electrode of two sheets with which the modulated light stratification ingredient which changes was applied to the 11.0-micron spacer made from glass fiber, and keeping the whole substrate at 36 degrees C, the ultraviolet rays of 45 mW/cm2 were irradiated for 60 seconds, and the liquid crystal display component was obtained.
[0049] The light absorption plate (edition [ first ] PARTII 2562of Dainippon Ink & Chemicals [, Inc. ] "DIC color guide of make", a chromaticity value: X= 0.228, Y= 0.344) was installed behind this liquid crystal display component. When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.305 and Y= 0.301.

[0050] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0051] (Physical properties of a liquid crystal ingredient "PN001")
Transition temperature 68.5 degree C (N-I) < -25 degrees C (C-N)
Refractive index ne= 1.787no= 1.583deltan= 0.254 threshold electrical potential differences (Vth) Viscosity of 1.15V20 degree C 59c.p Dielectric constant anisotropy deltaepsilon=26.9[0052] (Example 2) In the example 1, the light-scattering mold liquid crystal display component was obtained like the example 1 except having used first edition PARTII 2608of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.258, Y= 0.195) as a light absorption plate. When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.295 and Y= 0.272.
[0053] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0054] (Example 3) In the example 1, the light-scattering mold liquid crystal display component was obtained like the example 1 except having used first edition PARTII 2619of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.313, Y= 0.190) as a light absorption plate. When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.310 and Y= 0.264.
[0055] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0056] (Example 4) In the example 1, the light-scattering mold liquid crystal display component was obtained like the example 1 except having used first edition PARTII 2625of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.391, Y= 0.240) as a light absorption plate. When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.358 and Y= 0.274.
[0057] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0058] In an example 1, first edition PARTII 2489of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.506, Y= 0.322) is used as a light absorption plate. (Example 5) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.337 and Y= 0.297.
[0059] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0060] In an example 1, first edition PARTII 2562of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.228, Y= 0.344) is used as a light absorption plate. (Example 6) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.303 and Y= 0.305.
[0061] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0062] In an example 1, first edition PARTII 2608of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.258, Y= 0.195) is used as a light absorption plate. (Example 7) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.295 and Y= 0.299.
[0063] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0064] In an example 1, first edition PARTII 2619of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.313, Y= 0.190) is used as a light absorption plate. (Example 8) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.304 and Y= 0.293.
[0065] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.
[0066] In an example 1, first edition PARTII 2625of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X=

0.391, Y= 0.240) is used as a light absorption plate. (Example 9) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.343 and Y= 0.292.

[0067] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.

[0068] In an example 1, first edition PARTII 2489of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.506, Y= 0.322) is used as a light absorption plate. (Example 10) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.322 and Y= 0.309.

[0069] Thus, the light-scattering mold liquid crystal display component of this invention excels in surface whiteness far compared with the below-mentioned example of a comparison at the time of dispersion, and the color of a light absorption object in back cannot be seen easily, and it is clear at the time of transparence that it is the bright light-scattering mold liquid crystal display component excellent in the visibility which the color of a color absorption plate in back can recognize clearly.

[0070] (Example 1 of a comparison) In the example 1, the light-scattering mold liquid crystal display component was obtained like the example 1 except having used first edition PARTII 2540of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.420, Y= 0.476) as a light absorption plate. When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.372 and Y= 0.402.

[0071] Thus, it is clear at the time of dispersion that the light-scattering mold liquid crystal display component's of the example of a comparison the color of a light absorption object in back penetrates on a front face.

[0072] In an example 1, first edition PARTII 2540of Dainippon Ink & Chemicals, Inc. "DIC color guide of make" (chromaticity value: X= 0.420, Y= 0.476) is used as a light absorption plate. (Example 2 of a comparison) Furthermore, the light-scattering mold liquid crystal display component was obtained like the example 1 except having arranged what vapor-deposited zinc sulfide by the thickness of 100A on the pet film with a thickness of 50 micrometers as reflective increment film, as shown in drawing 2 . When the chromaticity value was measured from the side front of a liquid crystal display component, it was X= 0.360 and Y= 0.375.

[0073] Thus, it is clear at the time of dispersion that the light-scattering mold liquid crystal display component's of the example of a comparison the color of a light absorption object in back penetrates on a front face.

[0074]

[Effect of the Invention] The light-scattering mold liquid crystal display component of this invention is the thing of a thin film mold in a large area, and it sees from an observer side at the time of dispersion, excels in surface whiteness and brightness, and the color of a light absorption plate in back cannot be seen easily, and it is the light-scattering mold liquid crystal display component excellent in the visibility which the color of a light absorption plate in back can recognize clearly at the time of transparence.

[0075] According to these descriptions, the liquid crystal display component suitable for reflective mold means of displaying can be offered in a light-scattering mold liquid crystal display component.

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[Translation done.]

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DRAWINGS

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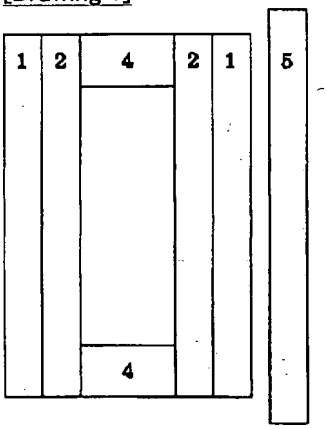
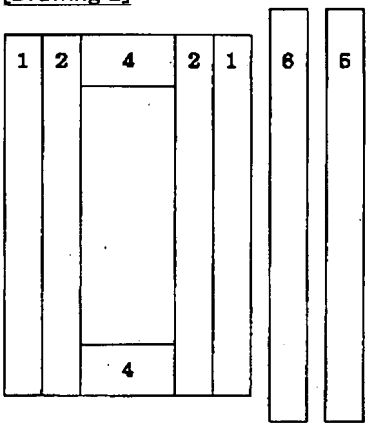
[Drawing 1]




[Drawing 2]

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[Translation done.]

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WRITTEN AMENDMENT

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---------- [a procedure revision]
[Filing Date] July 1, Heisei 6
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Easy explanation of a drawing
[Method of Amendment] Addition
[Proposed Amendment]
[Brief Description of the Drawings]
[Drawing 1] It is the sectional view showing the structure of the light-scattering mold display device of this invention.
[Drawing 2] It is the sectional view showing the structure of the light-scattering mold display device of this invention.
[Description of Notations]
1 Transparency Substrate
2 Transparent Electrode
3 Modulated Light Layer
4 Sealing Agent
5 Light Absorption Layer or Light Absorption Plate
6 Reflective Increment Film

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[Translation done.]